

CAPRELLA ARIMOTOI, A NEW SPECIES
(CRUSTACEA: AMPHIPODA: CAPRELLIDEA)
FROM THE SETO INLAND SEA, JAPAN

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Abstract.—*Caprella arimotoi* is described based on the material collected from the red alga *Pterocladia capillacea* (Gmelin) on the Mukaishima Island in the Seto Inland Sea. The new species is close to *C. verrucosa* Boeck, 1872, but differs in having few plumose setae on antenna II, forwardly vented projection on head and elongate gills. *Caprella (Spinicephala) pseudoverrucosa* (nomen nudum) mentioned in Arimoto's essay of 1978 is synonymous with the present species.

Caprella is the largest genus of the suborder Caprellidea (Crustacea: Amphipoda), widely distributed from temperate to boreal regions occurring primarily on seaweeds, seagrasses, and hydroids. So far about 130 species of this genus have been reported (e.g., McCain 1968; Laubitz 1970, 1972; McCain & Steinberg 1970; Vassilenko 1974; Arimoto 1976; Takeuchi 1989). During my short visit to the Mukaishima Marine Biological Station of Hiroshima University in June 1989, the author found numerous mature individuals of *Caprella* on the red alga *Pterocladia capillacea* (Gmelin) in the subtidal zone. A close examination of those materials revealed that some of them are identical with what has been called "young male" of *C. (Spinicephala) verrucosa* Boeck, 1872 in Arimoto (1976) and with *C. (S.) pseudoverrucosa* in Arimoto (1978). In this paper, the specimens are described as a new species.

The type specimens have been deposited in the National Science Museum in Tokyo (NSMT), National Museum of Natural History in Washington, D.C. (USNM), and Canadian Museum of Nature in Ottawa (NMCC). The definition of mature stages in females was referred to Takeuchi & Hirano (1991).

Caprella arimotoi, new species
Figs. 1–3

Caprella (Spinicephala) verrucosa, Arimoto, 1976, 122–129 (in part), fig. 67-D. (non *Caprella verrucosa* Boeck, 1872)

Caprella (Spinicephala [sic.] pseudoverrucosa Arimoto, 1978, 14, fig. 7C. (nomen nudum)

Material examined.—Holotype (NSMT 11191), male from *Pterocladia capillacea* (Gmelin) Bornet & Thuret found at the highest level of subtidal zone, Mukaishima Island, Seto Island Sea (34°22'N, 133°13'E), June 6, 1989, coll. I. Takeuchi. Allotype (NSMT 11192), female collected together with holotype. Paratypes: NSMT 11193 (14 males and 4 premature females), USNM 251762 (10 males and 1 mature and 2 premature females), and NMCC 1992-0603 (10 males and 1 mature and 3 premature females), all collected together with holotype. Arimoto's private collection No. 877-8, 1 male from *Sargassum* sp., Tsushima Islands, December 1946 (?).

Diagnosis.—Head with triangular forwardly pointing projection above eye. Pereonites II to VI each with 1 or 2 rounded dorsal projections. Antenna II of large male with 4–5 pairs of plumose setae on each of

peduncular segments II and III. Basis of gnathopod II shorter than half of pereonite II; propodus oval, palm with pointed projection near proximal end and shallow triangular projection near distal end. Gills elongate, small. Propodus of pereopods V to VII each with a pair of proximal grasping spines.

Description.—Holotype (Male; Figs. 1A, 2A–F', 3A–H). Body length 6.97 mm; length of head 0.45 mm; length of pereonites I to VII 0.34, 1.42, 1.37, 1.23, 1.05, 0.66, and 0.47 mm, respectively. Head anteriorly round; dorsal projection curved and pointed forward from posterior end. Pereonite I with small posterodorsal projection; pereonites II to IV each bearing a mid-dorsal and a posterodorsal blunt rounded projection. Pereonite V with a minute anterolateral and a mid-dorsal blunt rounded projection. Pereonite VI with a mid-dorsal triangular projection.

Antenna I about $\frac{1}{2}$ of body length. Peduncular segments longer in the order of II, I, and III; flagellum composed of 11 segments and somewhat longer than peduncle.

Antenna II about $\frac{2}{3}$ length of antenna I. Peduncular segments III and IV fringed with 5 pairs of plumose setae and with 5 pairs and a plumose setae, respectively; flagellar segment I with 4 pairs of short plumose setae; flagellar segment II with a short plumose setae followed by 3 setae on distal end.

Gnathopod I with propodus twice as long as width; palm serriform, setose with a pair of grasping spines near proximal end.

Gnathopod II with vestigial coxa inserting $\frac{1}{3}$ from anterior margin of pereonite II. Basis about $\frac{2}{5}$ of pereonite II. Propodus oval, $\frac{2}{3}$ of pereonite II. Palm with 2 projections; proximal one $\frac{1}{3}$ from proximal end, pointing distally, and carrying 4 setae on basal part; distal one low triangular and sparsely setose. Dactylus stout, distal $\frac{2}{5}$ of inner margin serrated.

Gills small, elongate, 3 times longer than width.

Pereopods V to VII with vestigial coxae.

Basis of pereopod V with laterally expanded projection carrying granulations; merus expanded on outer side; palm of propodus convex, coarsely setose, with a pair of grasping spines on a small knob near proximal end. Features of pereopods VI and VII close to that of pereopod V. Pereopods V to VII longer progressively; pereopod VII especially large, twice as long as pereopod VI.

Abdomen. Distal segment of appendage oval, shallowly divided into 3 apical teeth; basal segment with 5 or 6 setae surrounding distal segment. Lobes bearing several long setae. Penes medial.

Mouthparts. Inner plate of maxilliped round and distally expanded with 2 spiniform setae on distal margin and a facial row of several plumose setae; outer plate, subequal to inner plate, round and bearing 2 curved spiniform setae and 3 long setae on inner margin; segment II of palp with scarcely setose inner margin; segment III expanded distally, scarcely setose on lateral face; segment IV, longer than III, with sharp claw. Outer plate of maxilla I rectangular and slightly curved, with 7 spiniform teeth; distal segment of palp rectangular with 4 spiniform teeth on distal margin, 3 stout setae on distal part of inner margin, and a row of 5 long setae followed by a short seta on lateral face. Maxilla II with oval inner and rectangular outer plate; both with densely setose margins. Incisor of left mandible divided into 6 teeth; *lacinia mobilis* separated into 5 teeth followed by 3 setae; molar with a long seta near outer edge. Right mandible with 5-toothed incisor, *lacinia mobilis* carrying minute teeth on middle margin followed by 2 setae; molar large, with a long seta and bushy bundle of setae. Upper lip finely setose. Inner lobe of lower lip round, finely setose on distal part.

Female (allotype, figs. 1B, 2G–I, 3I). Body length 5.91 mm. Head 0.43 mm. Pereonites I to VII 0.22, 1.12, 0.97, 0.86, 0.87, 0.52, 0.49, and 0.44 mm, respectively.

Gnathopod II situated near anterior of pereonite II. Basis slightly shorter than $\frac{1}{2}$

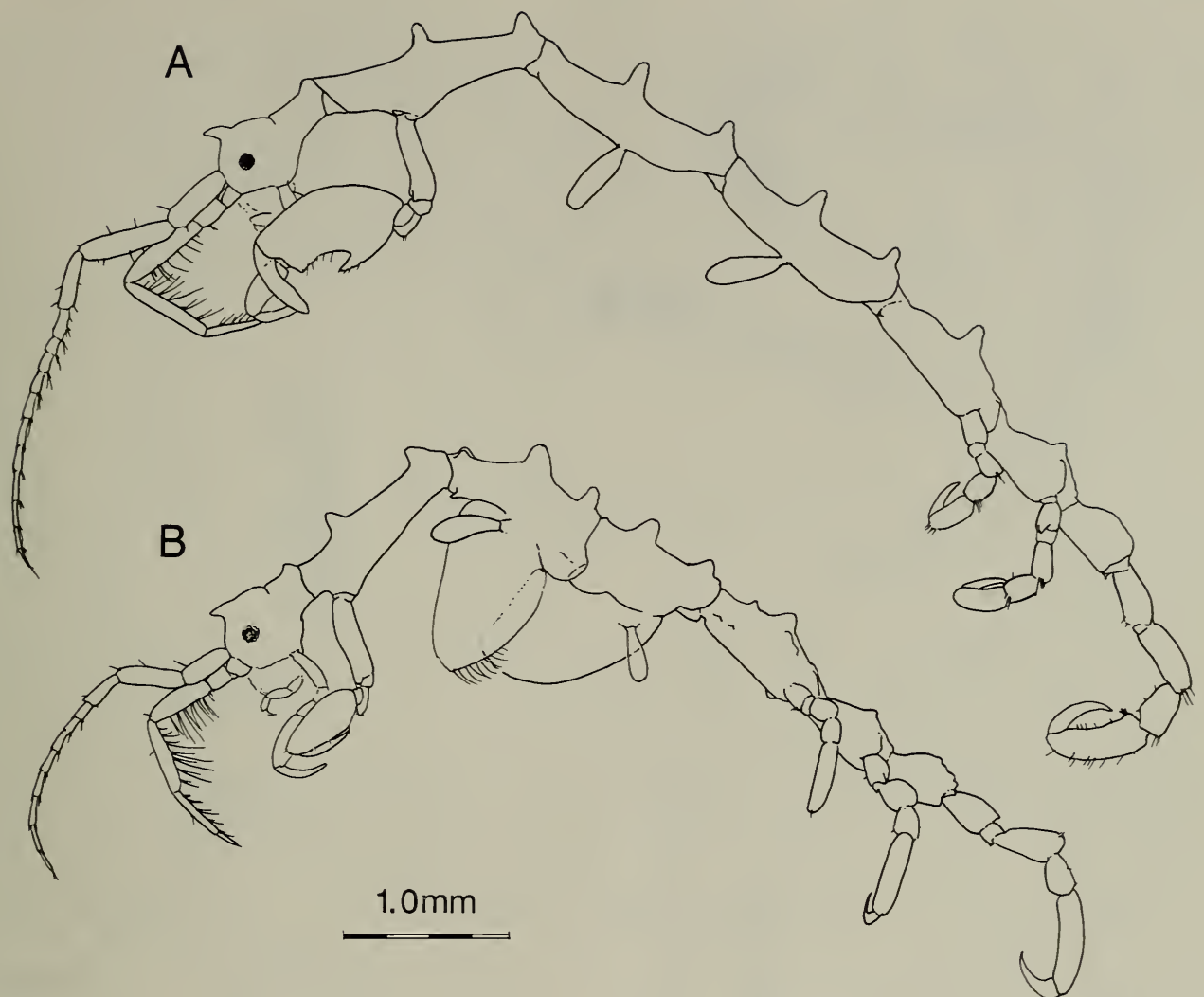


Fig. 1. *Caprella arimotoi*, n. sp. from Mukaishima Island in the Seto Inland Sea. A, holotype (male), 6.97 mm; B, allotype (female), 5.91 mm.

of pereonite II. Propodus oval, subequal to basis; palm smooth, convex and setose, with a grasping spine near proximal end.

Oostegite III setose on margin; oostegite IV minutely setose on anterior margin and moderately on posterior margin. Gills on pereonite III oval and those on pereonite IV smaller, elliptical. Abdomen with a pair of lobes without setae.

Etymology.—The specific name, *arimotoi*, is in honor of the late Dr. Ishitaro Arimoto, who made contributions to the taxonomy of the Japanese caprellidean amphipods and was the first person to find the present species.

Localities.—Type locality: Mukaishima Island, Seto Inland Sea (34°22'N, 133°13'E). Others: Tsushima Islands, and Tateyama

(Arimoto 1976) and Amatsu-Kominato (Takeuchi 1989; as *Caprella* sp. C), Chiba.

Remarks.—The present new species is close to *Caprella verrucosa* Boeck, 1872 in having blunt dorsal projections on pereonites I to VI, short basis and oval-shaped propodus in gnathopod II, and grasping spines on pereopods V to VII.

Caprella verrucosa was first reported from somewhere near San Francisco, California (Boeck 1872), and later recorded from both sides of the North Pacific; from the Queen Charlotte Islands, British Columbia to Santa Catalina Island, California (Dougherty & Steinberg 1953, Laubitz 1970, McCain & Steinberg 1970, Martin 1977, Marelli 1981), in the east, and from the Tsugaru Strait to the Kyusyu Islands along both Japanese

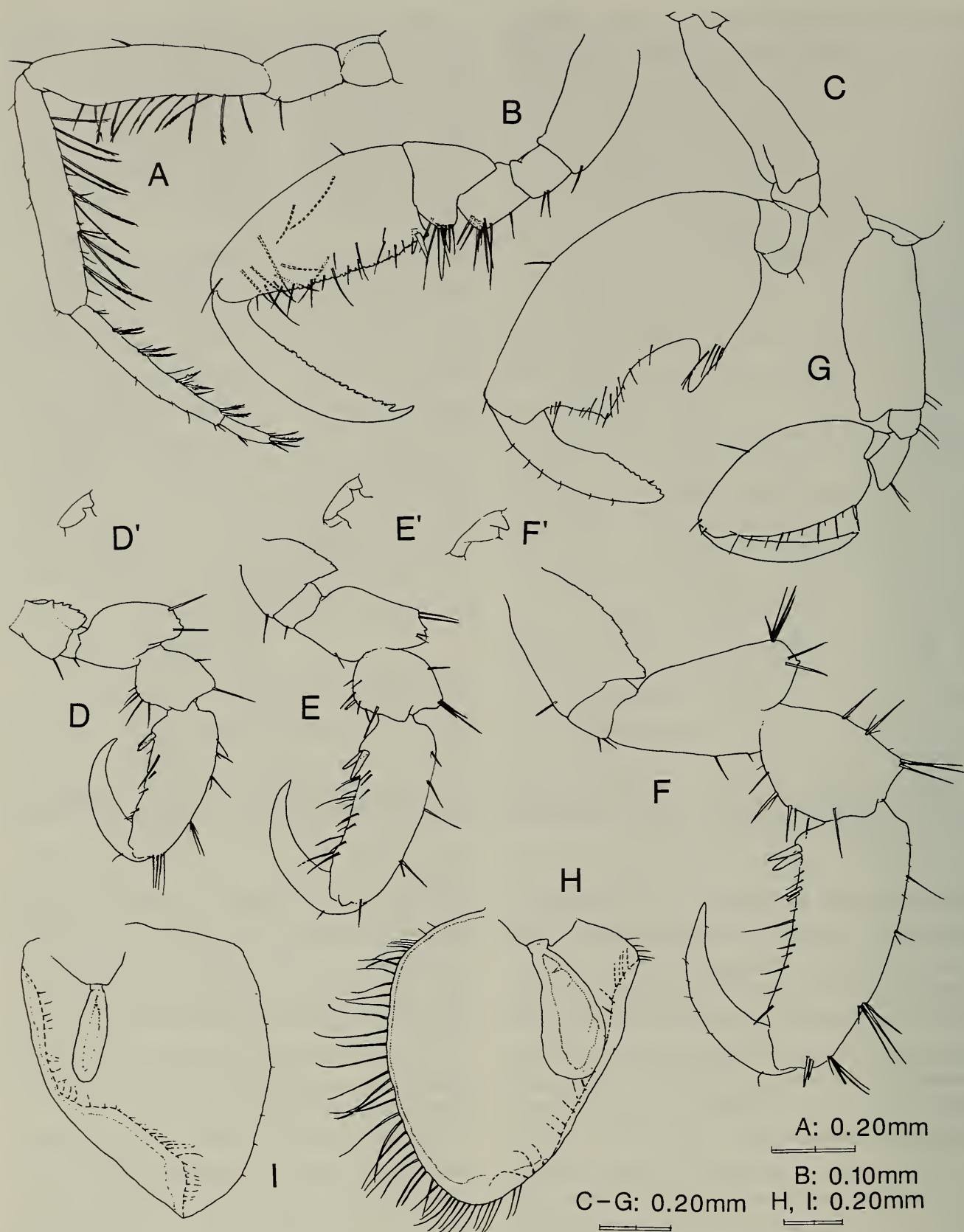


Fig. 2. *Caprella arimotoi*, n. sp. from the Mukaishima Island in the Seto Inland Sea. Holotype (male), 6.97 mm. A, antenna II; B, gnathopod I; C, gnathopod II; D, pereopod V; D', coxa of pereopod V; E, pereopod VI; E', coxa of pereopod VI; F, pereopod VII; F', coxa of pereopod VII. Allotype (female), 5.91 mm. G, gnathopod II; H, gill and oostegite on pereonite III; I, gill and oostegite on pereonite IV.

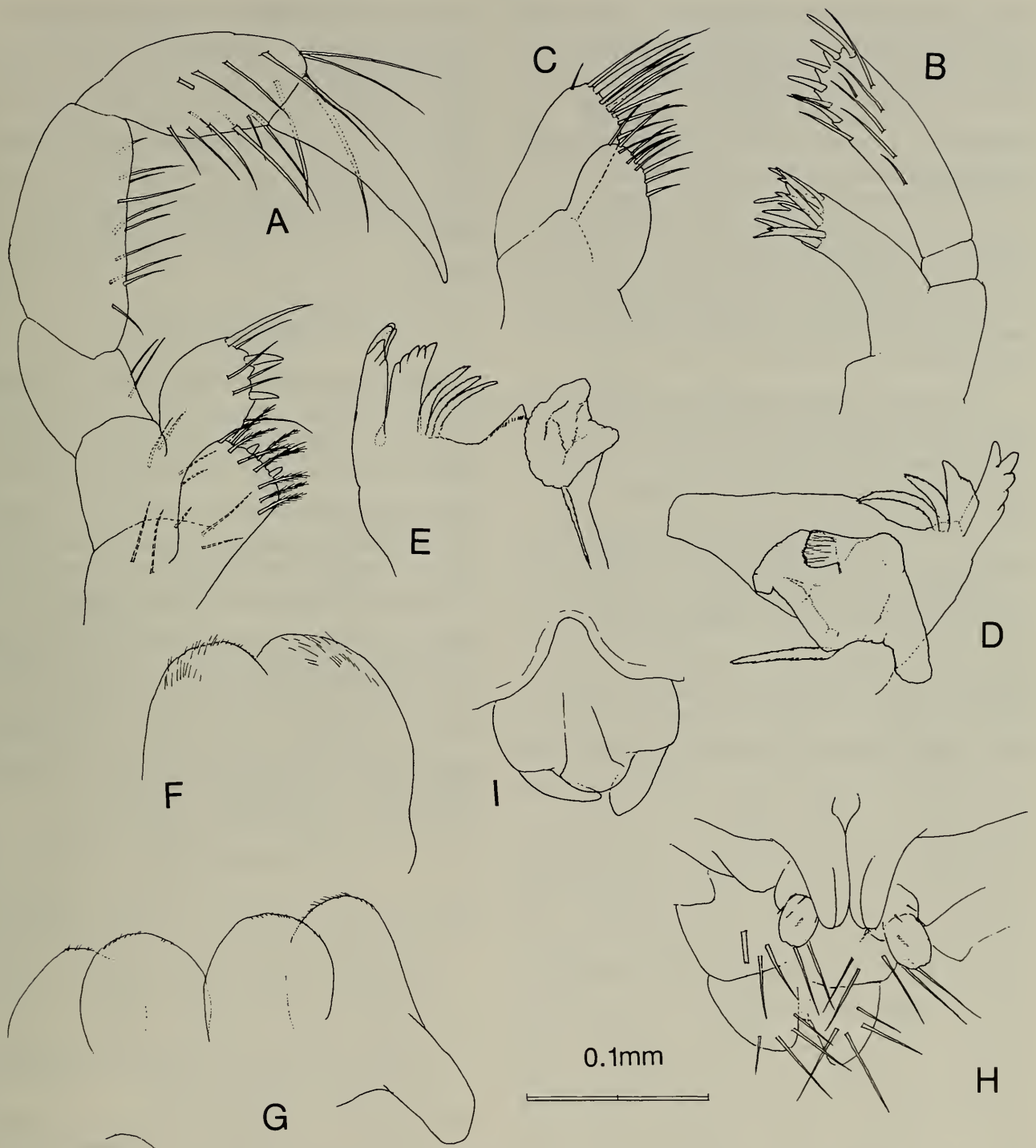


Fig. 3. *Caprella arimotoi*, n. sp. from the Mukaishima Island in the Seto Inland Sea. Holotype (male), 6.97 mm. A, maxilliped; B, maxilla I; C, maxilla II; D, right mandible; E, left mandible; F, upper lip; G, lower lip; H, abdomen. Allotype (female), 5.91 mm. I, abdomen.

coasts (Utinomi 1943, 1947, 1964; Arimoto 1976; Takeuchi 1989) and the south coast of the Korean Peninsula (Kim & Lee 1975, Lee 1988) in the west.

Mature males of *C. arimotoi* can be separated from those of *C. verrucosa* from the Japanese coast (Utinomi 1943, 1947; Tak-

euchi 1989) and British Columbia (Laubitz 1970) with the following characters: 1) Antenna I equal to $\frac{1}{2}$ of the body length ($\frac{1}{3}$ in *C. verrucosa*), 2) peduncular segments of antenna I slender, each about 4 times longer than width (2 to 3 times in *C. verrucosa*), 3) antenna II carrying 4–5 pairs of plumose

setae on peduncular segments II and III (more than 8 pairs of longer plumose setae in *C. verrucosa*), 4) mid-dorsal projection on the head curved forward, (straight forward in *C. verrucosa*), 5) lacking ventrolateral projections on pereonites III to IV (*C. verrucosa* with distinct ventrolateral projections on pereonites III and IV), 6) in *C. verrucosa*, additional paired projections on pereonites IV to V, and 7) gills 3 times longer than width (1.5 times longer in *C. verrucosa*).

The author examined the specimens of *C. verrucosa* collected from Vancouver Island, British Columbia, and deposited at the Canadian Museum of Nature (NMC 10867). The characters given above were found applicable also to these Canadian specimens.

Arimoto (1976) described two types of *C. (Spinicephala) verrucosa* from the Japanese coast. His robust type is identical with *C. verrucosa* as described by Utinomi (1943, 1947) and Takeuchi (1989), while the slender type belongs to the new species. Arimoto (1976) stated that the slender type represented the young stage of *C. verrucosa*, although its body was 6.5 mm long. Later, in his essay (Arimoto 1978), he showed the lateral view of slender type labelled "*Caprella (Spinicephala) pseudoverrucosa*." During the reexamination of Arimoto's collection, a specimen labelled "*C. pseudoverrucosa*" from the Tsushima Islands was found. The specimen, representing a large mature male of 8.79 mm long, is identified with *C. arimotoi*. This indicates that Arimoto had come to the same conclusion as the present author that the slender type was not a juvenile stage of *C. verrucosa*, but represented another species. His essay (Arimoto 1978), however, was written in Japanese and without any taxonomic account. Thus, it does not constitute a valid publication as specified by the International Commission on Zoological Nomenclature (1985; Article 8-(a)-(1) on pp. 12-13). A taxonomic account of *C. (S.) pseudoverrucosa* was never prepared by Arimoto. *Ca-*

prella sp. C in Takeuchi (1989) is also synonymous with *C. arimotoi*.

In conclusion, *Caprella arimotoi*, n. sp. clearly differs from *C. verrucosa* in several characters, and the slender "young male" of *C. (Spinicephala) verrucosa* in Arimoto (1976) and *C. (S.) pseudoverrucosa* in Arimoto (1978) are junior synonyms of *C. arimotoi*.

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